

CLAIMS

What is claimed is:

- 1 1. A magnetic head, comprising:
2 a free layer having an active area and tab regions on opposite sides of the active
3 area;
4 an antiparallel (AP) coupling layer formed above the free layer, the AP coupling
5 layer being formed of Ir; and
6 a bias layer formed above each of the tab portions of the free layer, magnetic
7 moments of the tab regions of the free layer being pinned antiparallel to
8 the magnetic moments of the bias layers.

- 1 2. The head as recited in claim 1, wherein the Ir AP coupling layer has a thickness of
2 at least about 15Å.

- 1 3. The head as recited in claim 1, wherein the Ir AP coupling layer has a thickness of
2 between about 15 and 25Å.

- 1 4. The head as recited in claim 1, wherein the Ir AP coupling layer has a coupling
2 strength of at least about 0.5 erg/cm².

- 1 5. The head as recited in claim 1, further comprising an AP pinned layer structure
2 below the free layer, the AP pinned layer structure includes at least two pinned
3 layers having magnetic moments that are self-pinned antiparallel to each other,
4 the pinned layers being separated by a second AP coupling layer.
- 1 6. The head as recited in claim 5, wherein the pinned layers of the AP pinned layer
2 structure are formed of CoFe.
- 1 7. The head as recited in claim 1, wherein the free layer is formed on a layer of Cu.
- 1 8. The head as recited in claim 1, wherein the free layer is formed on a layer of NiFe
- 1 9. The head as recited in claim 1, wherein the bias layers are formed of materials
2 selected from a group consisting of NiFe, CoFe, Ta, Ru and laminates thereof.
- 1 10. The head as recited in claim 1, wherein the free layer and the bias layer both
2 include fcc CoFe.
- 1 11. A magnetic head, comprising:
2 a free layer having an active area and tab regions on opposite sides of the active
3 area;
4 an antiparallel (AP) coupling layer formed above the free layer, the AP coupling
5 layer having a thickness of at least about 15Å; and

6 a bias layer formed above each of the tab portions of the free layer, magnetic
7 moments of the tab regions of the free layer being pinned antiparallel to
8 the magnetic moments of the bias layers.

1 12. The head as recited in claim 11, wherein the AP coupling layer is formed of Ir.

1 13. The head as recited in claim 11, wherein the AP coupling layer has a thickness of
2 at least 15 Å.

1 14. The head as recited in claim 11, wherein the AP coupling layer has a thickness of
2 between about 15 and 25 Å.

1 15. The head as recited in claim 11, wherein the AP coupling layer has a coupling
2 strength of at least about 0.5 erg/cm².

1 16. The head as recited in claim 11, further comprising an AP pinned layer structure
2 below the free layer, the AP pinned layer structure includes at least two pinned
3 layers having magnetic moments that are self-pinned antiparallel to each other,
4 the pinned layers being separated by a second AP coupling layer.

1 17. The head as recited in claim 16, wherein the pinned layers of the AP pinned layer
2 structure are formed of CoFe.

- 1 18. The head as recited in claim 11, wherein the free layer is formed on a layer of Cu.
- 1 19. The head as recited in claim 11, wherein the free layer is formed on a layer of
2 NiFe
- 1 20. The head as recited in claim 11, wherein the bias layers are formed of materials
2 selected from a group consisting of NiFe, CoFe, Ta, Ru and laminates thereof.
- 1 21. The head as recited in claim 11, wherein the free layer and the bias layer both
2 include fcc CoFe.
- 1 22. A magnetic storage system, comprising:
2 magnetic media;
3 a head for reading from and writing to the magnetic media, the head having a
4 structure as recited in claim 1;
5 a write element coupled to the sensor;
6 a slider for supporting the head; and
7 a control unit coupled to the head for controlling operation of the head.
- 1 23. A magnetic storage system, comprising:
2 magnetic media;
3 a head for reading from and writing to the magnetic media, the head having a
4 structure as recited in claim 11;

- 5 a write element coupled to the sensor;
- 6 a slider for supporting the head; and
- 7 a control unit coupled to the head for controlling operation of the head.